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Root and Stem Diseases of Soybeans

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PLANT DISEASES

Mimeo BP 6-7

ROOT AND STEM DISEASES OF SOYBEANS

In recent years, soybeans have become increasingly important to Indiana agriculture. Introduction of new and better varieties, development of potential weed control chemicals for soybean fields and improved cultural practices have contributed to the increased emphasis on the Hoosier soybean crop. In 1959, Indiana planted 2,269,000 acres of soybeans and harvested 60,112,000 bushels, valued at \$116,864,000.

Diseases have become recognized as production problems that must be solved to insure profit from growing soybeans. Soybean diseases may affect the foliage (See Mimeo BP 6-2, "Soybean Foliage Diseases".) or may attack the roots, stems and other parts of the plant.

In Indiana, there are five root rot and stem diseases that commonly attack soybeans, causing variable damage from year to year. Each of these diseases has characteristic symptoms, which enable the farmer or county agent to identify the trouble readily. All of these diseases cause affected plants to wilt, turn brown and ultimately die.

Pythium Root Rot

Pythium root rot is a seedling disease which may cause both pre-emergence and post-emergence destruction of soybeans in seasons when wet weather prevails during and after planting.

Soybeans infected with the Pythium fungus have a dark, discolored area extending up the stem several inches from the soil line. The diseased area becomes soft and watery and sloughs off when the plants are pulled from the soil. Infected plants may occur singly or in small groups scattered through the field.

Pythium root rot is caused by the soil inhabiting fungus Pythium ultimum, and may become very severe in wet seasons, especially in poorly drained soils. The disease probably causes little yield reduction, unless large groups of plants are destroyed. When this disease becomes a problem, the grower should treat his seed with a fungicide and avoid planting soybeans in poorly drained fields or wet areas. (See Mimeo BP 6-1, "Soybeans Seed Treatment".)

Rhizoctonia Root Rot

This is primarily a seedling disease which attacks young plants when the soil is unusually wet. It results in the appearance of a sunken, reddish lesion on the stem at the soil line. In contrast with Pythium root rot, infected stems remain firm and dry, and the diseased

plants wilt and die in areas four to 10 feet in diameter, distributed irregularly throughout the field. This disease is caused by the common soil inhabiting fungus Rhizoctonia solani and is usually most damaging early in the growing season during late May and early June.

There is no control for this disease, but seed treatment with recommended chemical seed protectants may improve soybean stands in heavily infested soils. (See Mimeo BP 6-1, "Soybean Seed Treatment".)

Phytophthora Root and Stem Rot

Soybean plants may be attacked by this disease at any stage of their development. The disease does not result in a typical rot, but causes a dark brown discoloration of the roots, which extends a considerable distance up the stem. Infected plants, which wilt rapidly and die, are found most commonly in heavy, poorly-drained soils, especially where surface water has remained standing for several days.

The soybean varieties Blackhawk and Monroe are resistant to the disease, but usually produce somewhat lower yields than other recommended varieties. For this reason, a mixture of 1/3 Blackhawk and 2/3 Harosoy or Hawkeye may be advisable when planting soybeans in areas where this disease has been a problem in the past.

The reason for this suggestion is that the resistance of Blackhawk to the disease permits this variety to grow and mature in low lying areas of the field where root rot is a problem. Since Blackhawk does not yield as well as Harosoy, the mixture suggested will give better stands and yields than Blackhawk alone, where Phytophthora root rot is not a problem. Straight plantings of a susceptible variety results in killing of all plants in infested or low areas.

At the present time, resistance to Phytophthora root and stem rot is being introduced into the varieties Lindarin, Harosoy, Shelby and Clark. But it will be several years before the full range of these improved varieties will be available to Indiana farmers.

Brown Stem Rot

Brown stem rot is caused by the fungus Cephalosporium gregatum, which enters the soybean plant through the roots. The brown stem rot fungus grows most rapidly in older plants, so it usually appears in late August or early September. The disease is favored by cool weather during this period. When the stems of infected plants are split open, a dark brown discoloration of the pith may extend the entire length of the plant. Plants affected in this manner have weak stems and frequently lodge severely. Sometimes during hot dry weather, a browning and dying of the leaf tissue between the veins may occur. This is a drought effect, induced by the plugging of water conducting tissues in the soybean stem by the stem rot fungus. Leaf symptoms associated with the brown stem rot disease may be mistaken for frost injury.

All commercial varieties of soybeans are susceptible to brown stem rot. Rotations in which soybeans do not occur more than once in every 3-4 years have proved the most effective method of checking the damage brown stem-rot may cause.

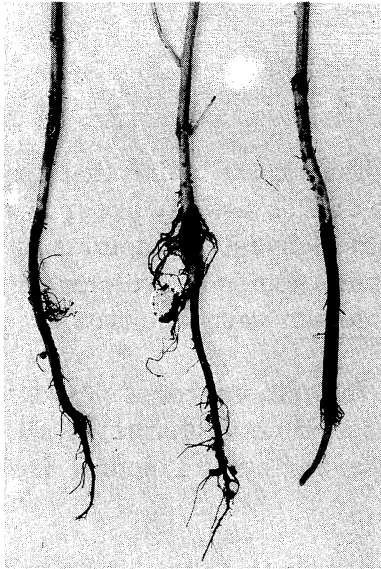
Stem Canker

This disease is recognized by the formation of a reddish-brown lesion that girdles the stem and causes the plant to wilt and die. Lesions of stem canker usually occur at the fourth or fifth node or in the region of the second and third trifoliate leaves. Symptoms of stem canker usually appear in late July or early August at the time when pods are starting to fill out. Stem canker is caused by the fungus Diaporthe phaseolorum var: caulivora.

Soybean varieties vary greatly in their susceptibility to stem canker. Hawkeye is the most susceptible variety and should be replaced by less susceptible varieties, such as Harosoy and Lindarin, where stem canker is a serious problem. The varieties Lincoln, Shelby and Clark are only moderately susceptible to stem canker.

Stem canker is seed borne, so beans from badly diseased fields should not be used for planting if disease-free seed is available. Diseased stubble in the field is also a source of infection and should be thoroughly plowed under before seeding. Preferably, a rotation as suggested for brown stem rot should be followed.

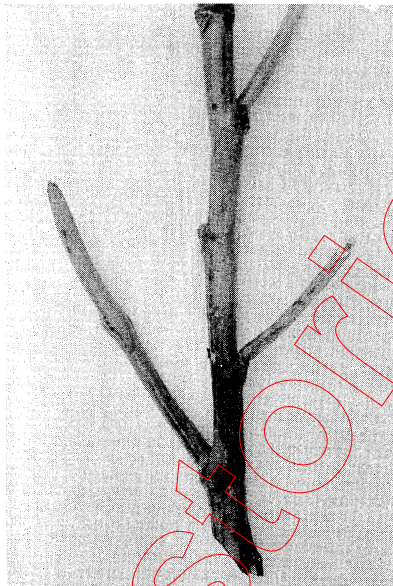
How to Recognize Soybean Root and Stem Diseases



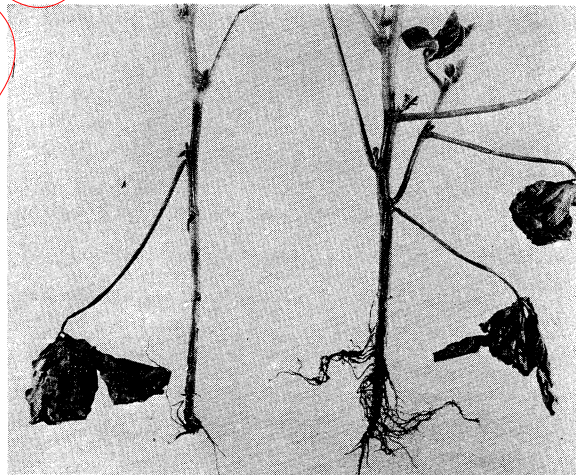
Rhizoctonia Root Rot



Brown Stem Rot



Stem Canker



Phytophthora Root Rot

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